

In re Patent Application of:

**KENNETH JOHN DAVEY**

Serial No. **09/905,681**

Filing Date: **7/13/2001**

Docket No. **90017**

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**Remarks**

Applicant and the undersigned would like to thank the Examiner for his efforts in the examination of this application. Reconsideration is respectfully requested.

**I. Election/Restrictions**

The Examiner has withdrawn Claims 30-38 pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species.

Claims 30-38 have been withdrawn from the amended claim set presented herein.

**II. Rejection of Claims 1, 2, 4, 5, 7, 10, 20, 22, 23, and 29 under 35 USC 102(b)**

The Examiner has rejected Claims 1, 2, 4, 5, 7, 10, 20, 22, 23, and 29 under 35 USC 102(b) as being anticipated by Haupt (U.S. Patent No. 4,344,320).

Independent Claims 1, 20, and 29 have been amended to more particularly point out that which Applicant regards as his invention, and Claims 3 and 21 have been canceled. Specifically, a recitation in the method Claims 1 and 29 has been added of coupling a high fluid flow impedance in series between the cavities and the source, wherein the impedance is sufficiently high to allow only a minuscule flow of the first fluid. A corresponding amendment is proposed to the independent apparatus Claim 20. Support

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for this feature may be found in the Specification as published at paragraphs [0077] and [0079] on pages 3 and 4.

One of the substantive differences between the present invention and the disclosure in Haupt is that Haupt employs a throttling member 14, while the invention of Claims 1, 20, and 29 employs a high fluid flow impedance. Haupt states that the throttling member 14 can have a restriction equivalent to half that of the piping system. Haupt, at column 4, line 12, provides, as a example, the use of plastic tubes having diameters in the range of 1.5 to 5 mm. The throttling member 14 in Haupt is used in conjunction with a differential pressure indicator 15 to form a common pressure drop flow meter. Significantly, the sensitivity of this flow metering arrangement in Haupt is such that it is sufficiently insensitive as to not respond to a continuity leakage flow measured by a series connected flow meter 12 via a throttle 11 (see in particular column 5, lines 7 – 14). This suggests that in order for the Haupt arrangement to work, the crack size in the piping system 4 would need to be sufficiently large so as to not significantly impede the fluid flow.

In contrast, in the present invention, which has practical application in the aerospace and military areas, for example, it is critical for the method and apparatus to have very high sensitivity in order to enable the detection of sub-millimeter cracks. In order to obtain this sensitivity, it is absolutely critical that the impedance allow only a minuscule flow of fluid.

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Indeed, the greater the impedance, the more sensitive is the present method and apparatus for monitoring the integrity of a structure.

If the Haupt system were used with the present invention, the crack would need to be of a size sufficiently large to overcome the "threshold" referred to at column 5, line 11, of Haupt in order for it to be detected. However in the event for example of a jet aircraft in flight, a crack of such a size may be indicative of an impending catastrophic failure. Clearly detection of a crack at that point in time may be too late. The present invention, by use of the high impedance, allows detection of sub-millimeter cracks that would not normally lead to immediate or short-term catastrophic failure, providing sufficient time for corrective maintenance.

It is further noted that Haupt requires the use of cryogenic temperatures in order to facilitate brittle cracking of a piping system 4. Such limitation is not required in the present invention. Additionally, in the present invention, the cavities are inherent structural cavities of the structure itself rather than artificially introduced cavities that alter the basic form of the structure being monitored. A recitation addressing this feature has been added to the preambles of Claims 1 and 20. A similar recitation has been added to Claim 29, wherein the "cavities" have been indicated as being "inherent structural cavities".

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Therefore, Claims 1, 20, and 29 as amended are believed to patentably define over the cited art, and Claims 2, 4, 5, 7, 10, and 22, and 23, dependent therefrom, are also believed to patentably define over the cited art.

**III. Rejection of Claims 6 and 24 under 35 USC 102(b)**

The Examiner has rejected Claims 6 and 24 under 35 USC 102(b) as being unpatentable over Haupt '320 in view of Schulte (U.S. Patent No. 5,390,533).

As these claims are dependent from Claims 1 and 20, Claims 6 and 24 are also believed patentable over the cited art.

**Conclusions**

Applicant respectfully submits that the above amendments place this application in a condition for allowance, and passage to issue is respectfully solicited. The Applicant and the undersigned would like to again thank the Examiner for his efforts in the examination of this application and for reconsideration of the claims as amended in light of the

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arguments presented. If the further prosecution of the application can be facilitated through telephone interview between the Examiner and the undersigned, the Examiner is requested to telephone the undersigned at the Examiner's convenience.

Respectfully submitted,



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**CERTIFICATE OF MAILING**

I hereby certify that the foregoing is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, this 17<sup>th</sup> day of July, 2003.



Edward Bradley